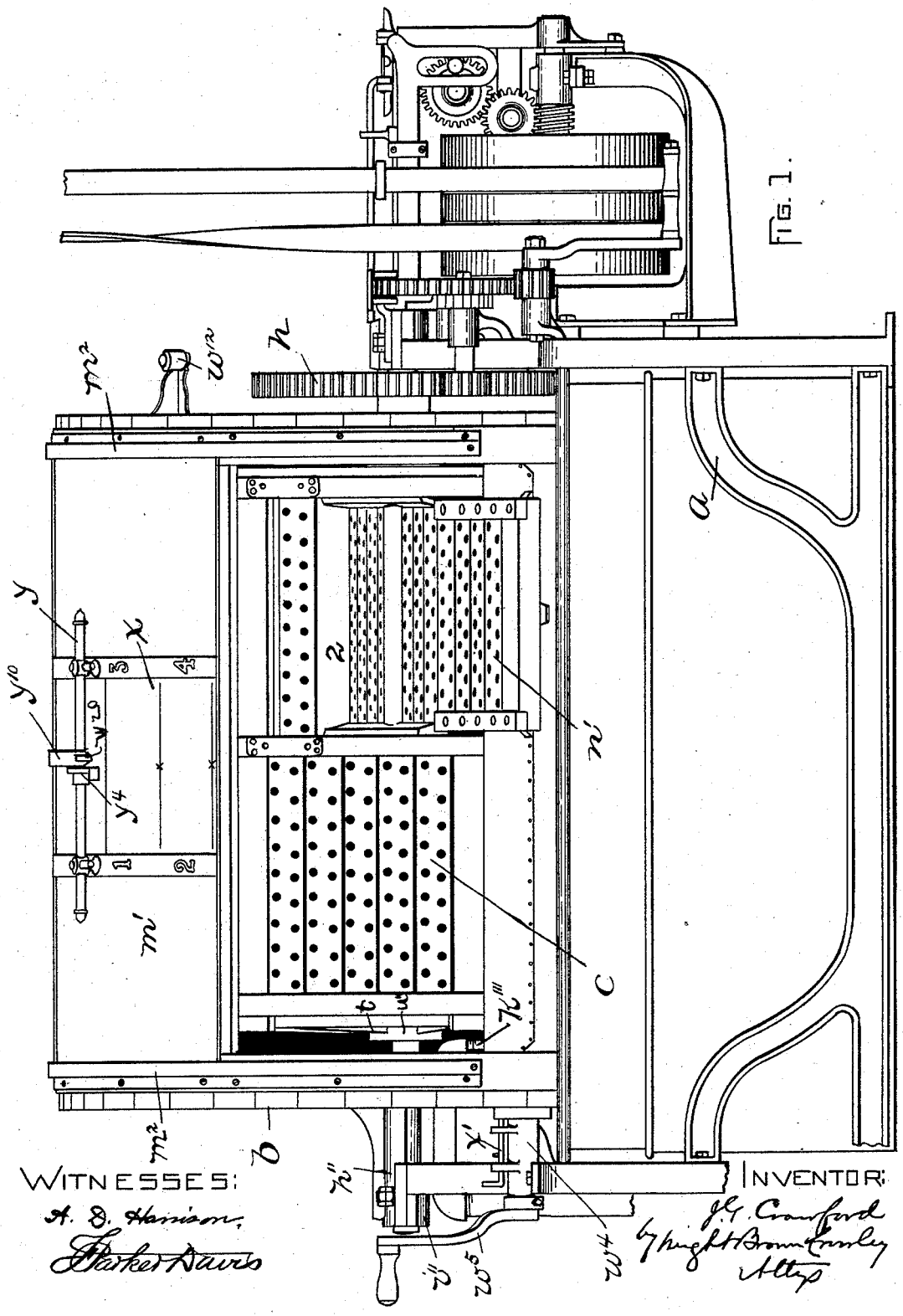
(No Model.) 5 Sheets—Sheet 1.

J. G. CRAWFORD.

WASHING MACHINE.

No. 522,970. Patented July 17, 1894.



(No Model.) 5 Sheets—Sheet 2.

J. G. CRAWFORD.

WASHING MACHINE.

No. 522,970. Patented July 17, 1894.

FIG. 2.

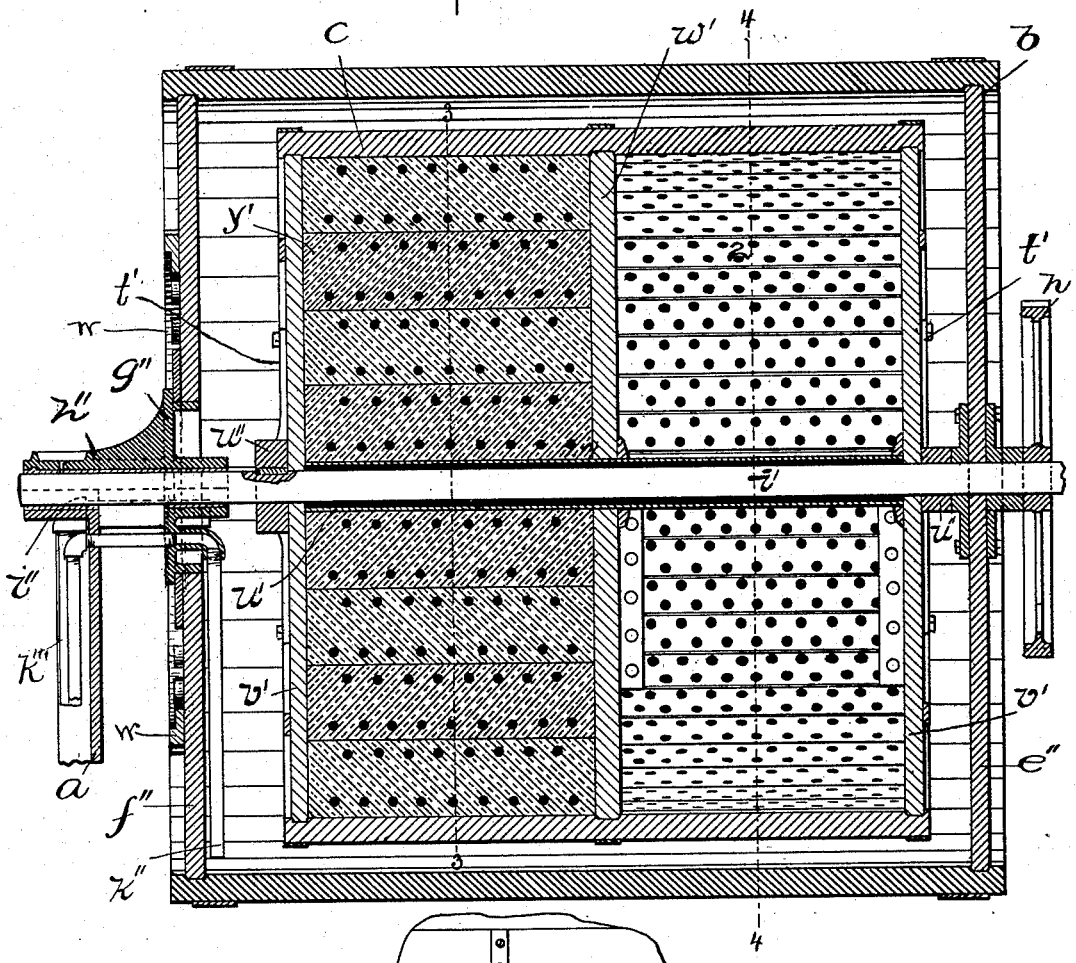
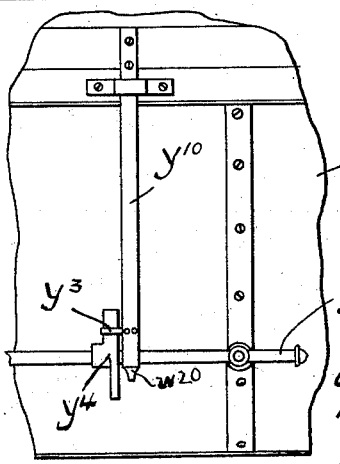


FIG. 10.



WITNESSES:
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Parker Davis

INVENTOR:
J. G. Crawford
by Wright Brown Quinby & Kelly

(No Model.) 5 Sheets—Sheet 3.

J. G. CRAWFORD.

WASHING MACHINE.

No. 522,970. Patented July 17, 1894.

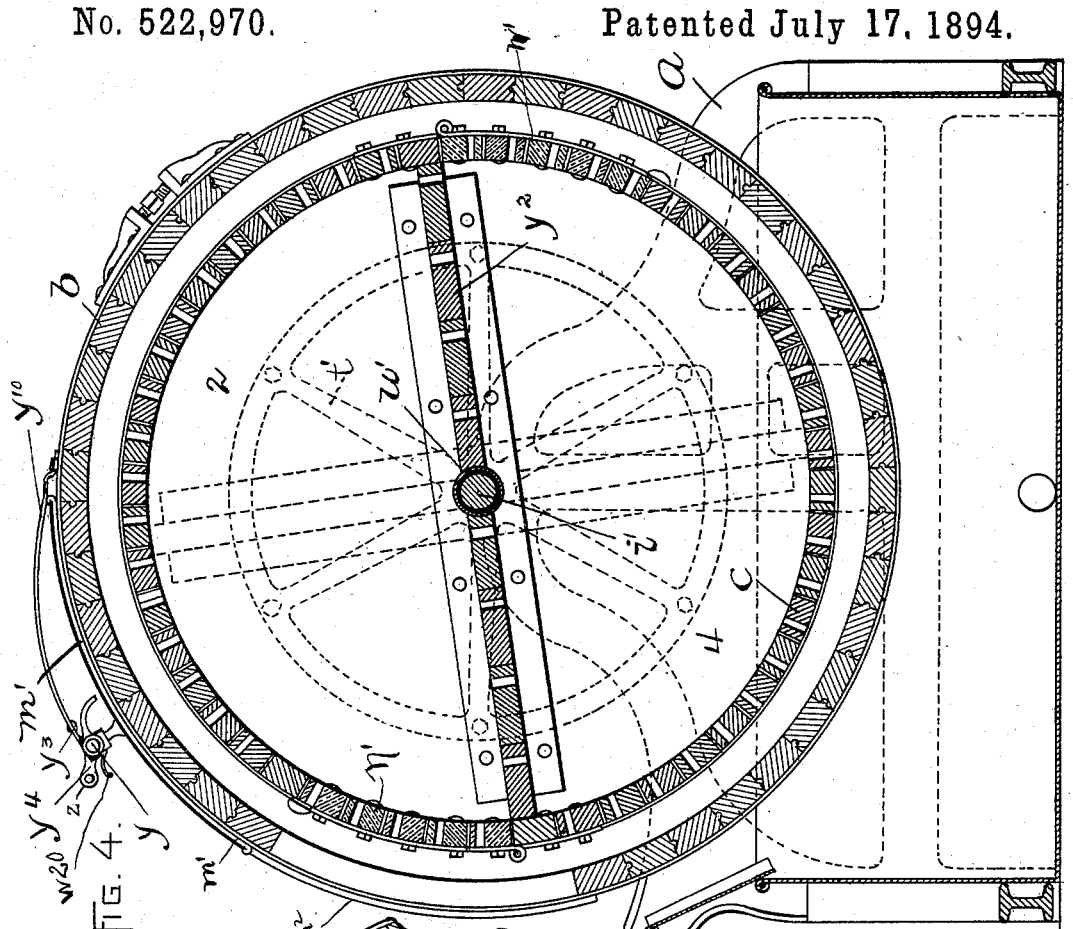

FIG. 4.

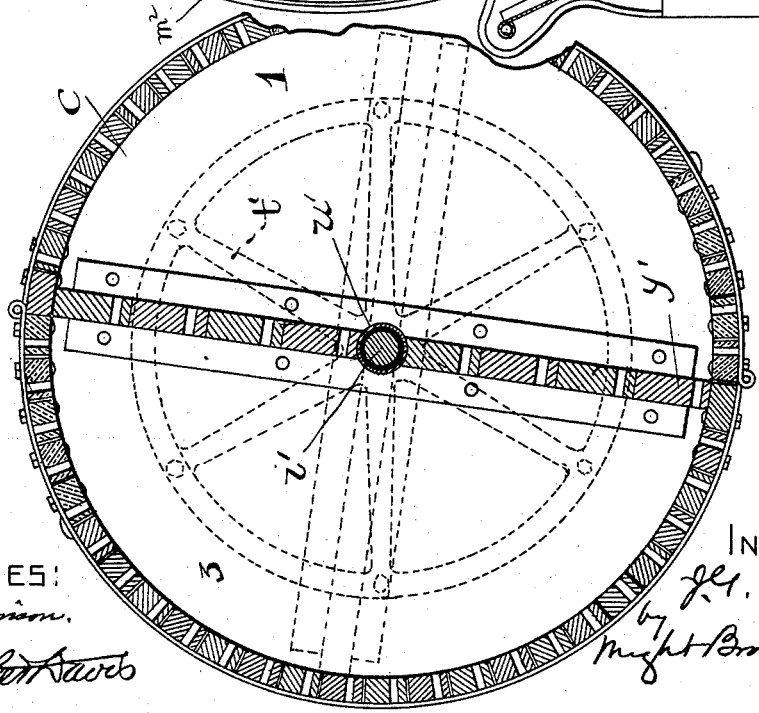

FIG. 3.

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(No Model.) 5 Sheets—Sheet 4.

J. G. CRAWFORD.

WASHING MACHINE.

No. 522,970. Patented July 17, 1894.

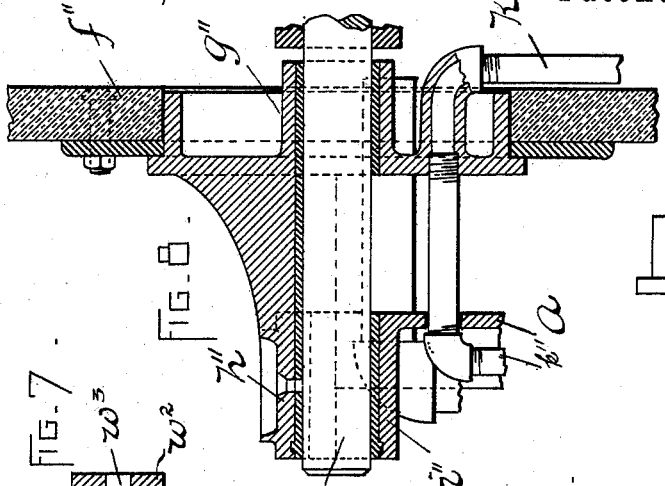

FIG. 8.

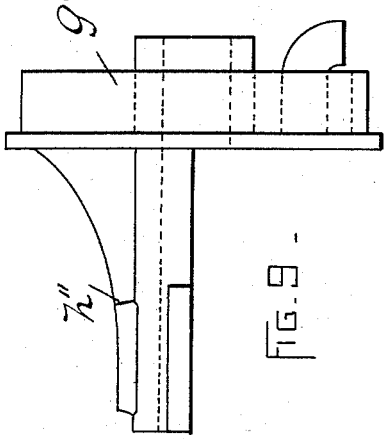

FIG. 9.

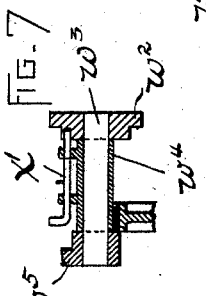

FIG. 7.

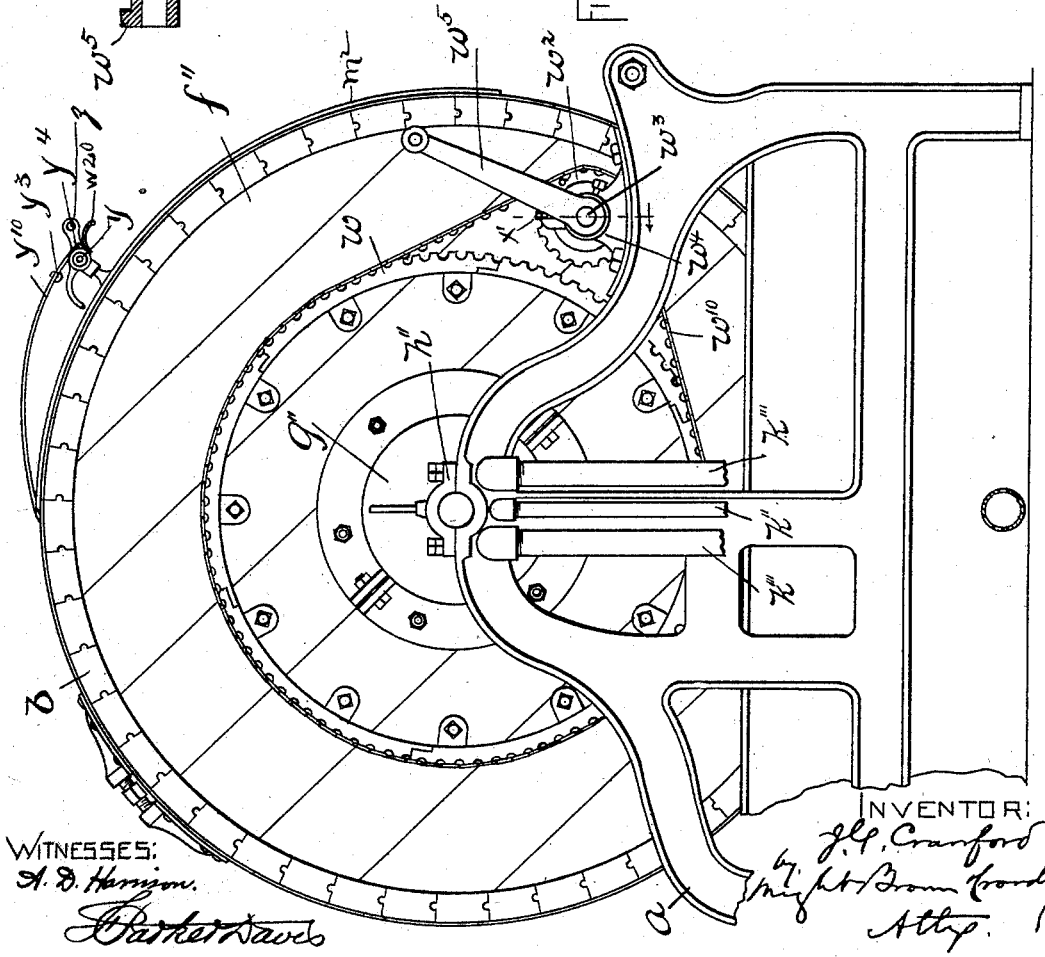

FIG. 5.

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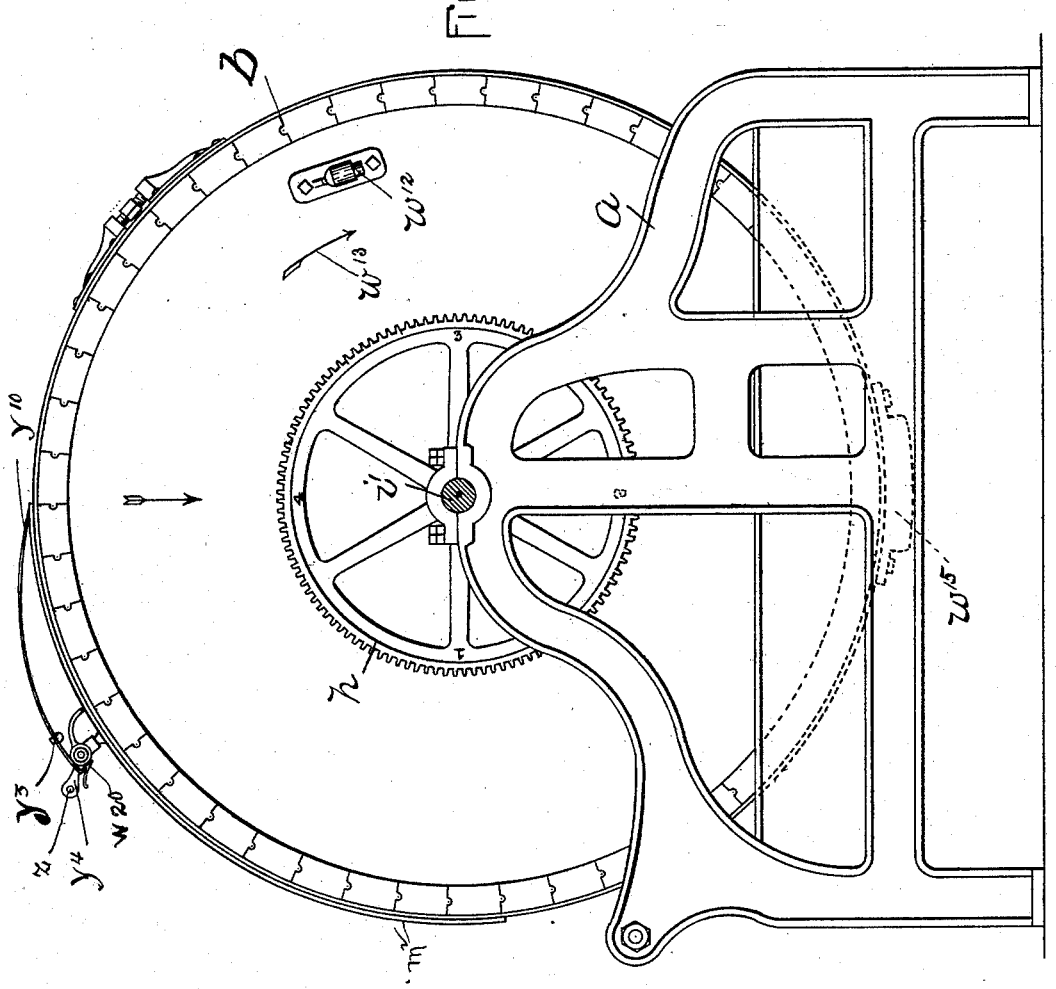
(No Model.) 5 Sheets—Sheet 5.

J. G. CRAWFORD.

WASHING MACHINE.

No. 522,970. Patented July 17, 1894.

Fig. 6.



Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

JAMES G. CRAWFORD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE CRAWFORD LAUNDRY MACHINERY COMPANY, OF PORTLAND, MAINE.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 522,970, dated July 17, 1894.

Application filed July 7, 1893. Serial No. 479,816. (No model.)

To all whom it may concern:

Be it known that I, JAMES G. CRAWFORD, of Boston, (Charlestown,) in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Washing-Machines, of which the following is a specification.

This invention relates to washing machines commonly used in laundry work, in which a rotating cylinder is arranged within a fixed cylinder and adapted to be rotated in opposite directions by suitable reversing mechanism.

The invention has for its object to provide improved means for conducting steam and water into the rotary cylinder, and certain improvements in the construction of the cylinders, all of which will be fully described hereinafter.

Of the accompanying drawings, forming part of this specification: Figure 1 shows a front elevation of the machine, representing the door of the outer cylinder open, and the door of one of the compartments of the rotary cylinder open. Fig. 2 shows a longitudinal section of the cylinders. Figs. 3 and 4 show cross-sections on lines 3—3 and 4—4 of Fig. 2. Fig. 5 shows an elevation of one end of the machine, looking from the left of Fig. 1. Fig. 6 shows an elevation of the opposite end. Fig. 7 shows a sectional detail of a lock for holding the outer cylinder fixed. Fig. 8 shows an enlarged section of the bearing for the end of the outer cylinder where the water and steam pipes enter. Fig. 9 shows a detail of the said bearing, in elevation. Fig. 10 shows a plan view of a portion of the outer cylinder, illustrative of a latch for holding the door open.

The same letters of reference indicate the same parts in all the figures.

In the drawings: the letter *a* designates the supporting-frame, *b* the outside cylinder, and *c* the rotating cylinder or "washer."

The outside cylinder *b* is adapted to be rotated independently of the inside cylinder, and has an opening in its periphery, adapted to be closed by a sliding door *m'*. When the cylinder *c* is to be charged or emptied, the outside cylinder *b* is rotated sufficiently to bring the opening therein to the position represented in Fig. 1, so that the door *n'* of the cylinder *c* can be opened and swung downwardly. In this position, the compartment 2 may be charged or emptied, as the case may be, after which the cylinder *c* may be turned to bring another compartment to the opening, until all the compartments are treated or disposed of.

The inside cylinder *c* is rotated by means of a gear-wheel *h* affixed to its journal at one end on the exterior of the cylinder *b*, and said gear has marks at four equidistant points, as seen in Fig. 6, and an arrow is inscribed on the head of the outside cylinder. By this means, the position of each compartment of the inside cylinder with relation to the outside cylinder may be determined without opening the latter, so that the door of each inner compartment may be brought to the proper position for filling or discharging before opening the door of the outside cylinder, this being determined by registering a mark on the gear *h* with the arrow on the head of the outside cylinder.

The compartments of the inside cylinder are numbered, and a black-board *x* affixed to the door *m'* is divided into a corresponding number of spaces, which are correspondingly designated. The lot of clothes in compartment No. 1 is entered on space No. 1 of the black-board, and the contents of the other compartments are likewise indicated, and in this way the attendant may keep track of the clothes in the washer.

The main-shaft *i'* passes directly through the central portion of the cylinders, and the washer-cylinder *c* is secured to said shaft by means of "spiders" *t' t'*, secured to the shaft and to the heads of the cylinder *c* (see dotted lines in Fig. 3), said spiders having hubs *u''* secured to the shaft *i'*. This construction is simple and durable, and prevents liability of the inner cylinder being loosened by the twisting strain to which it is subjected.

To prevent contact of the material which is being washed with the shaft, I surround the latter with an imperforate casing or sleeve, consisting preferably of a brass tube *u'*, secured between the cylinder heads *v' v'* in such manner as to secure a tight joint and prevent corrosion of the shaft.

The washing-cylinder c is subdivided into compartments 1, 2, 3, 4, by a central partition w' extending crosswise of the cylinder and dividing the latter into two sections, and by partitions y' y^2 extending lengthwise of the cylinder and arranged at right angles to each other, so that four compartments are provided. The advantage of the described arrangement of the partitions y' y^2 is that, as the cylinder revolves and the contents are carried around and up to the point where they fall, the material in one compartment is balanced by the material in an opposite one, so that the intermittent strain upon the driving mechanism is avoided, and the machine rendered more durable.

As already indicated, the outside cylinder is stationary during the washing operation, and is adapted to be rotated on its bearings by hand, for the purpose of bringing the discharge opening (which, during the washing operation, is at the upper side) to the position shown in Fig. 1, for convenience in removing or inserting the contents. To facilitate this operation, a gear w is fastened to the cylinder-head, and connected by a chain w^{10} with a smaller gear w^3, mounted on a shaft w^3, which is supported in a bearing w^4 on the frame a and carries a crank w^5 on its outer end. As a means for locking the cylinder b, I employ a bolt x', arranged to slide in guides on the bearing w^4 and be projected into a hole in the gear w^2, the arrangement being such that, when the cylinder is rotated to bring the bolt into alignment with the hole, the opening in the cylinder is brought to the desired point for charging or emptying the washer c.

The water and steam used in the washing operation are introduced into the cylinder by improved means, which I will now describe.

Referring to Fig. 2, it will be seen that the outside cylinder is supported in position by the main-shaft, the head e'' of the cylinder bearing directly thereon, while the head f'' bears upon a collar or hub g'' formed integrally with the cap h'', which secures the shaft i' in its bearing i'', formed upon the supporting-frame a, to which bearing the cap-portion of the hub g'' is suitably secured by bolts in the usual manner. The hub is held by the cap in a fixed position, the lower half of the hub being provided with integral tubular passages, as shown in Figs. 2 and 8, the inner ends of which are turned downwardly for the insertion of pipes for the introduction of steam and water to the cylinder, as shown. The pipes k'' k''', intended for heating the supply of water by introduction of steam, are extended downwardly from the inside of the hub, so that their bottom ends will be beneath the surface of the water-supply in the cylinder, as shown in Fig. 2.

The outer cylinder is preferably provided with a yielding buffer w^{12}, which, when the cylinder is turned in the direction indicated by the arrow w^{13} in Fig. 6, strikes the supporting-frame and prevents further rotation of the cylinder in the same direction. The cylinder has a weight w^{15} on its periphery arranged to normally hold the cylinder with its door at the top. The buffer w^{12} by striking the frame limits the movement of the cylinder under influence of the weight. The door m' slides in ways m^2 on the cylinder, and the following means are employed to hold it open: A horizontal rod y is mounted upon it, and may serve as a handle, and a spring-latch y^{10} is fastened at one end to the cylinder, and at its opposite end has a catch w^{20} to take over the said rod y and hold the door open. Said spring has a laterally-projecting arm y^3 fastened to it, and a trip y^4, pivoted on the rod y, has a curved part adapted to extend under said lateral arm. When it is desired to release the door, the trip is pulled downward, which causes it to raise the spring y^{10} and disengage the catch w^{20} from the bar y. When the door is opened, the rod y rides under the catch, and the latter springs over it. The trip has an opening z adapted to receive a hook, whereby it may be tilted.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the inner cylinder, the outer cylinder, the shaft extending through both cylinders and having the inner cylinder fixed to turn therewith, fixed bearings for said shaft outside of the cylinders, the hub or ring affixed to one of said bearings and surrounding the shaft and supporting one head of the outer cylinder, the lower part of said hub having orifices, and pipes extending through said orifices and into the cylinder where they turn downward, as set forth.

2. The hub or ring g'' having on its upper portion an arm formed as a half bearing or bearing-cap and provided with integral tubular passages in its lower portion, said passages being screwthreaded for the connection thereto of liquid-conducting pipes, substantially as described.

3. In a washing machine, an exterior cylinder having a side opening, a sliding door over said opening, a rod fastened to said door, a spring-latch fastened to the cylinder and adapted to engage the said rod when the door is open, and a trip pivoted on the rod and adapted to disengage the latch from the bar.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 16th day of June, A. D. 1893.

JAMES G. CRAWFORD.

Witnesses:
A. D. HARRISON,
F. PARKER DAVIS.